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Bomersbach et al.

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(54) **APPARATUS FOR VERIFYING THE INNER DIAMETER OF TUBULARS FORMING A TUBULAR STRING**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,257,080 A 9/1941 Turner

2,740,480 A 4/1956 Cox

(Continued)

OTHER PUBLICATIONS

United States Patent and Trademark Office as International Searching Authority for PCT/US2019/059004, dated Feb. 17, 2020, all pages, United States Patent and Trademark Office, Alexandria, VA, USA.

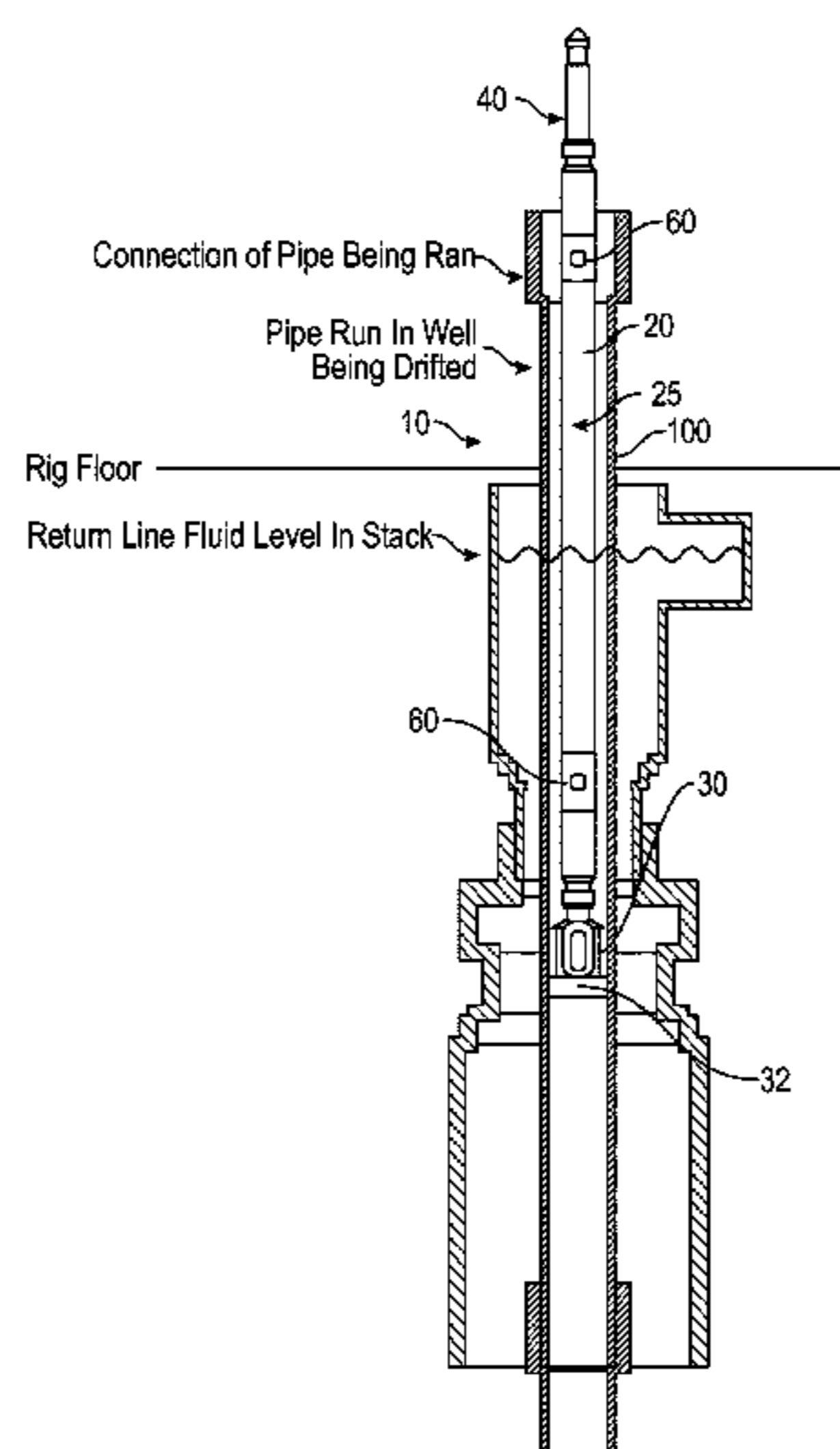
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(57) **ABSTRACT**

A floating drift apparatus for verifying the inner diameter of tubulars as the tubulars are made up into a tubular string being run into a wellbore. A float section provides buoyancy to float the apparatus in fluid within the bore of a tubular, and a drift section has a drift element with a diameter substantially equal to the tubular inner diameter being verified, which may be the drift diameter. When running a tubular string, the apparatus is inserted into the bore of the tubular string, floating in the fluid. As joints of tubular are made up and run into the wellbore, the tubulars move downhole around the apparatus. Preferably, the floating drift apparatus can be visually detected. If an undersize ID is encountered, the floating drift apparatus will be pushed downhole and no longer visible; the operator can remove the undersize ID tubular from the string.

8 Claims, 8 Drawing Sheets



US 11,549,363 B2

(51) **Int. Cl.** 4,354,379 A * 10/1982 Miner E21B 17/006
E21B 17/00 (2006.01) 33/DIG. 2
E21B 47/002 (2012.01) 4,427,061 A 1/1984 Moore
G01B 3/50 (2006.01) 5,012,866 A 5/1991 Skipper
G01B 5/10 (2006.01) 5,163,515 A * 11/1992 Tailby E21B 23/08
E21B 27/00 (2006.01) 166/383
E21B 34/06 (2006.01) 5,181,571 A 1/1993 Mueller et al.
5,732,774 A 3/1998 Haggard

(52) **U.S. Cl.** 6,536,531 B2 3/2003 Brunet
CPC *E21B 47/002* (2020.05); *G01B 3/50* 6,581,453 B1 6/2003 Bjornstad
(2013.01); *G01B 5/12* (2013.01); *E21B 27/00* 7,828,060 B2 11/2010 Churchill
(2013.01); *E21B 34/063* (2013.01); *G01B 5/10* 8,061,053 B2 * 11/2011 Gillan G01B 5/12
(2013.01) 33/544.4
8,925,213 B2 * 1/2015 Sallwasser E21B 47/08
33/544.2

(56) **References Cited**
U.S. PATENT DOCUMENTS
11,098,554 B2 * 8/2021 Brown E21B 33/128
2004/0094305 A1 5/2004 Skjaerseth et al.
2010/0263441 A1 10/2010 Gillan
2018/0135398 A1 5/2018 Entchev et al.

4,034,807 A 7/1977 Prince et al.
4,287,948 A * 9/1981 Haggard E21B 37/04
166/170

* cited by examiner

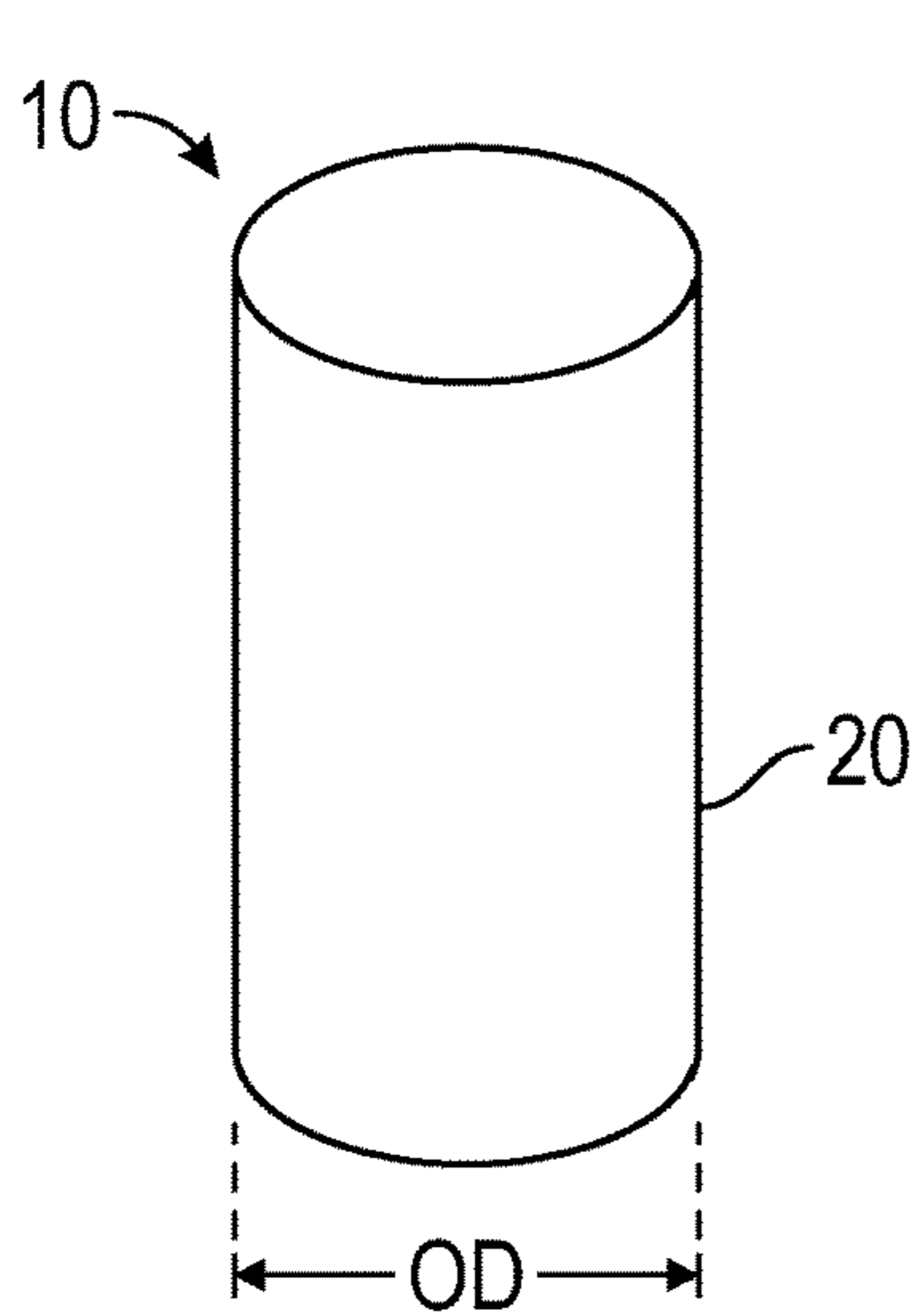


FIG. 1

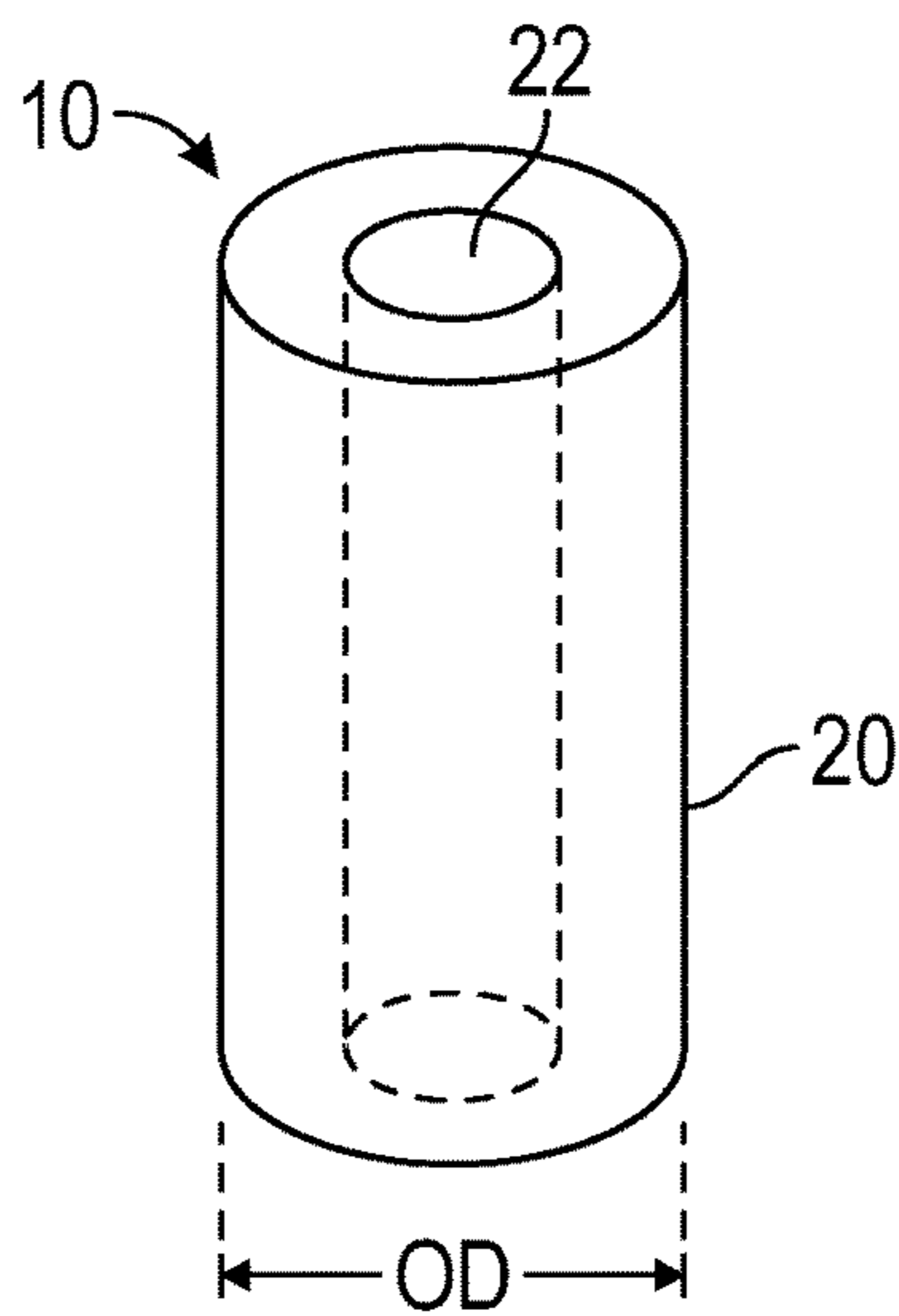


FIG. 2

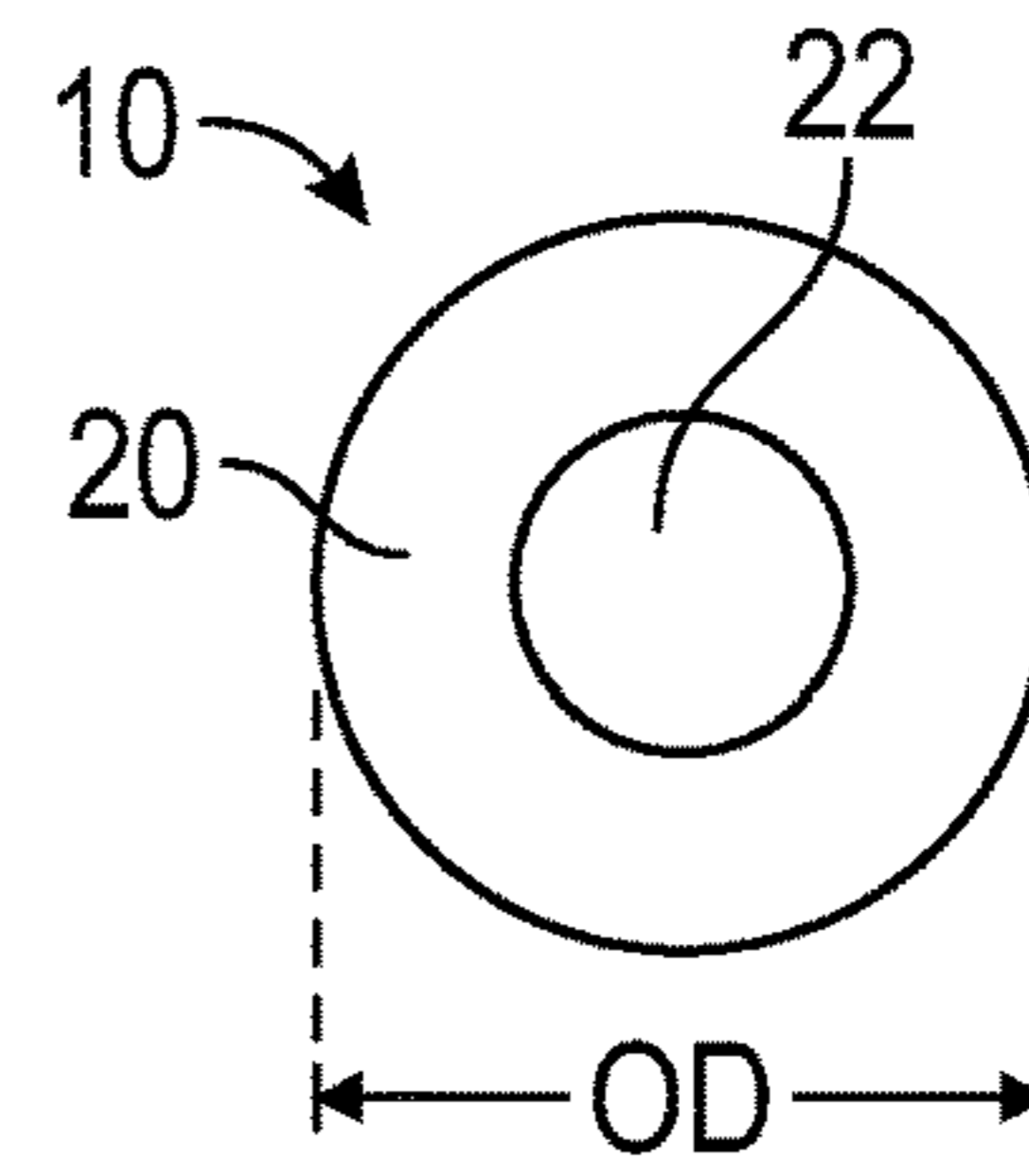


FIG. 3

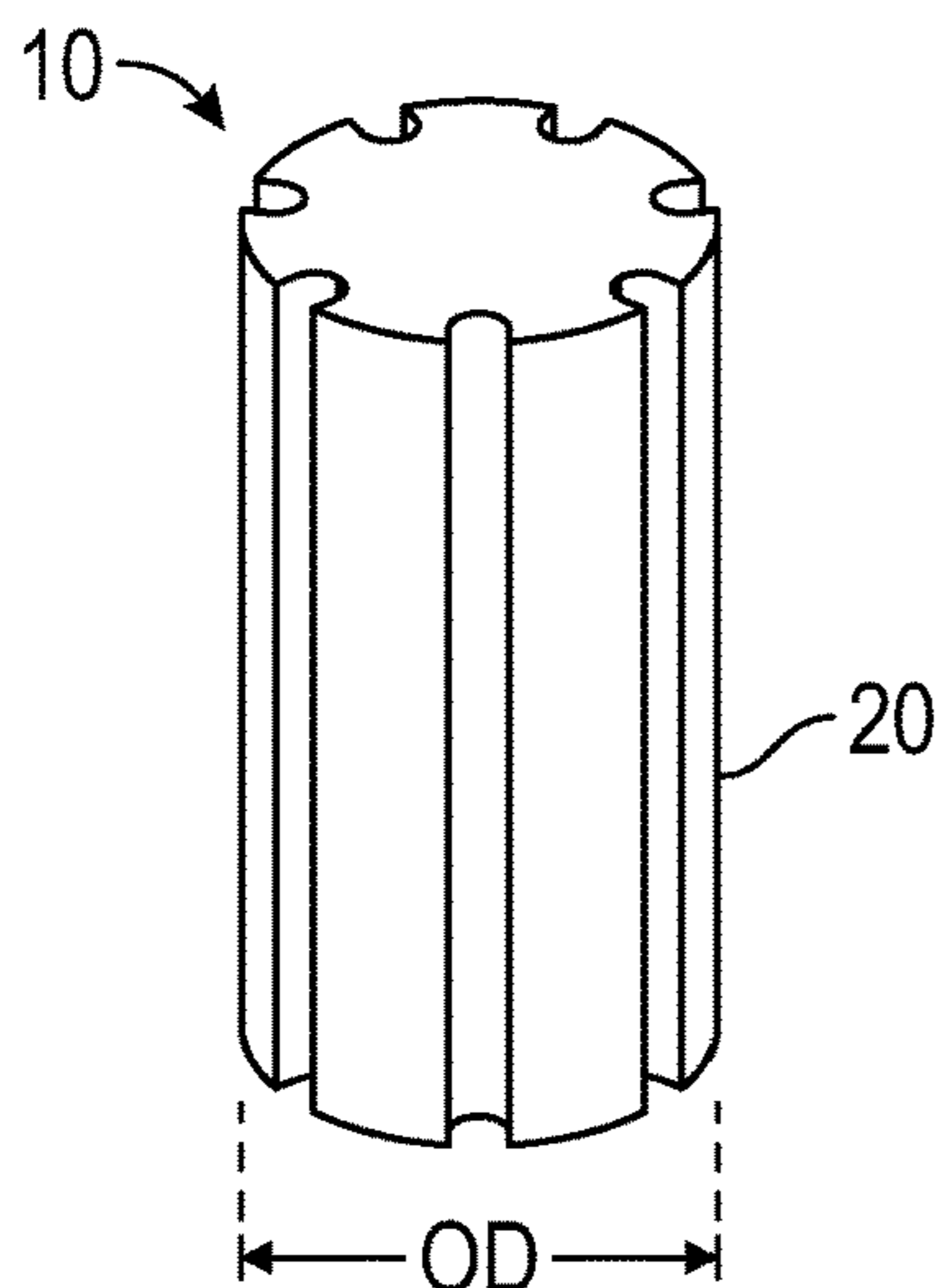


FIG. 4

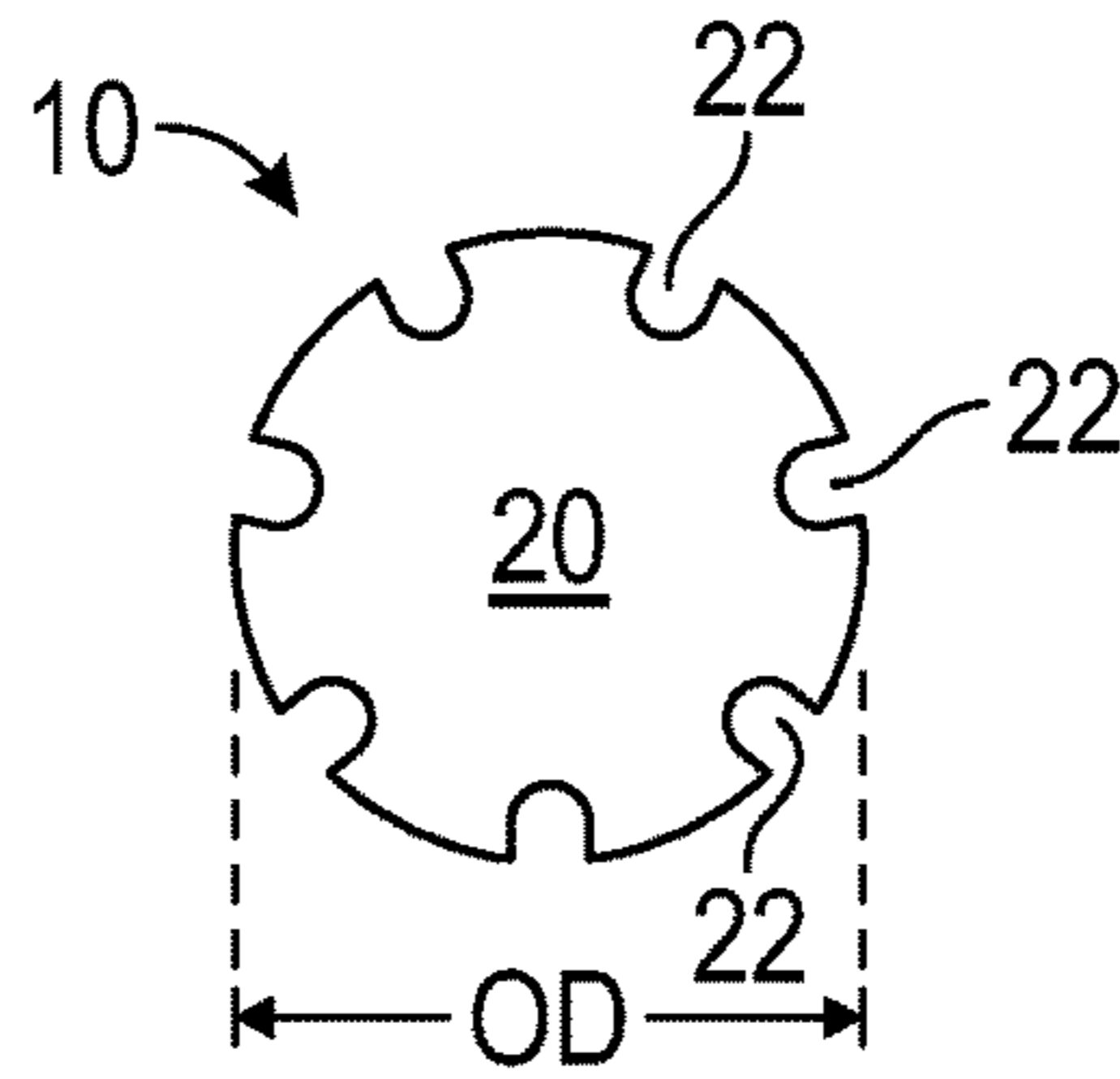


FIG. 5

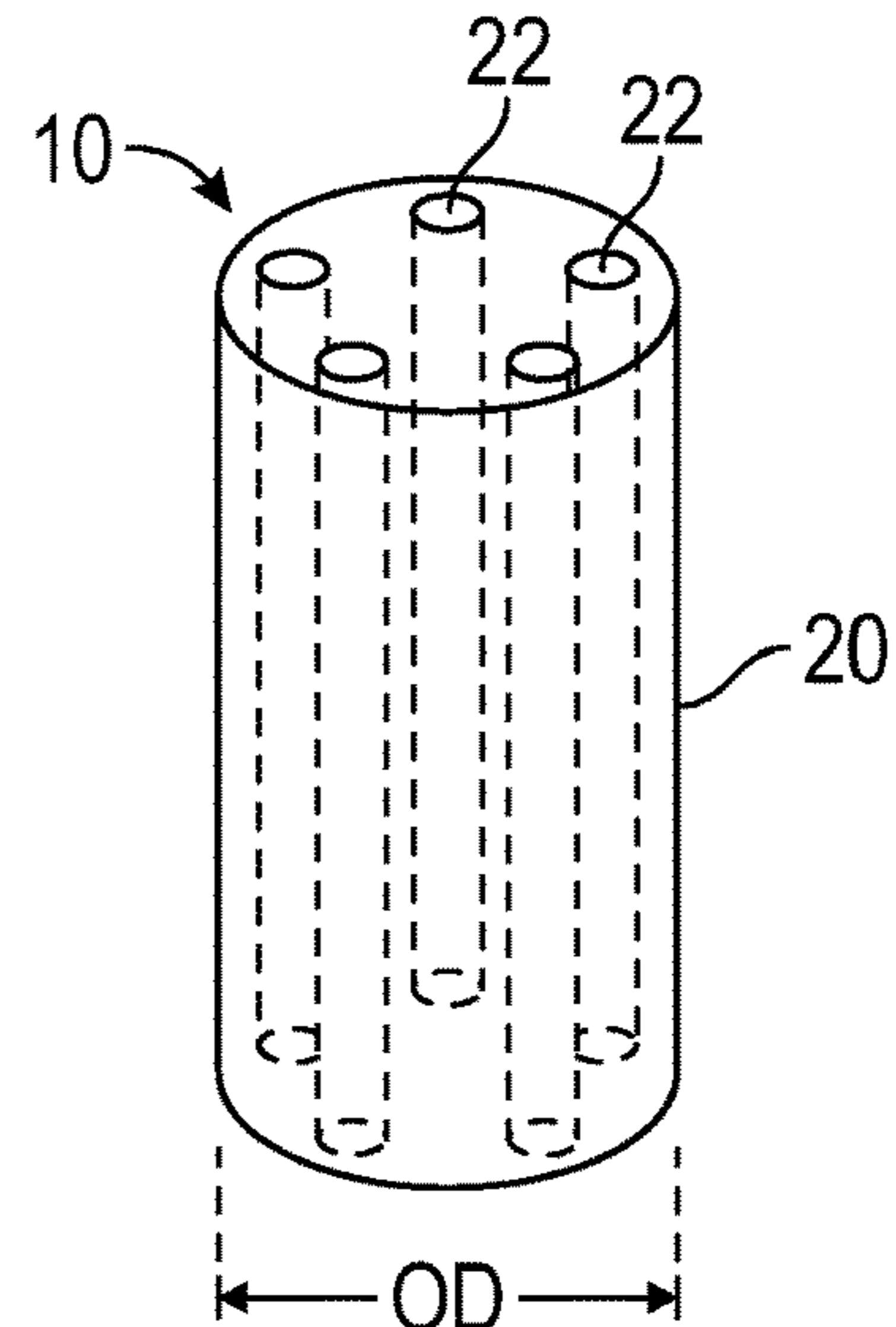


FIG. 6

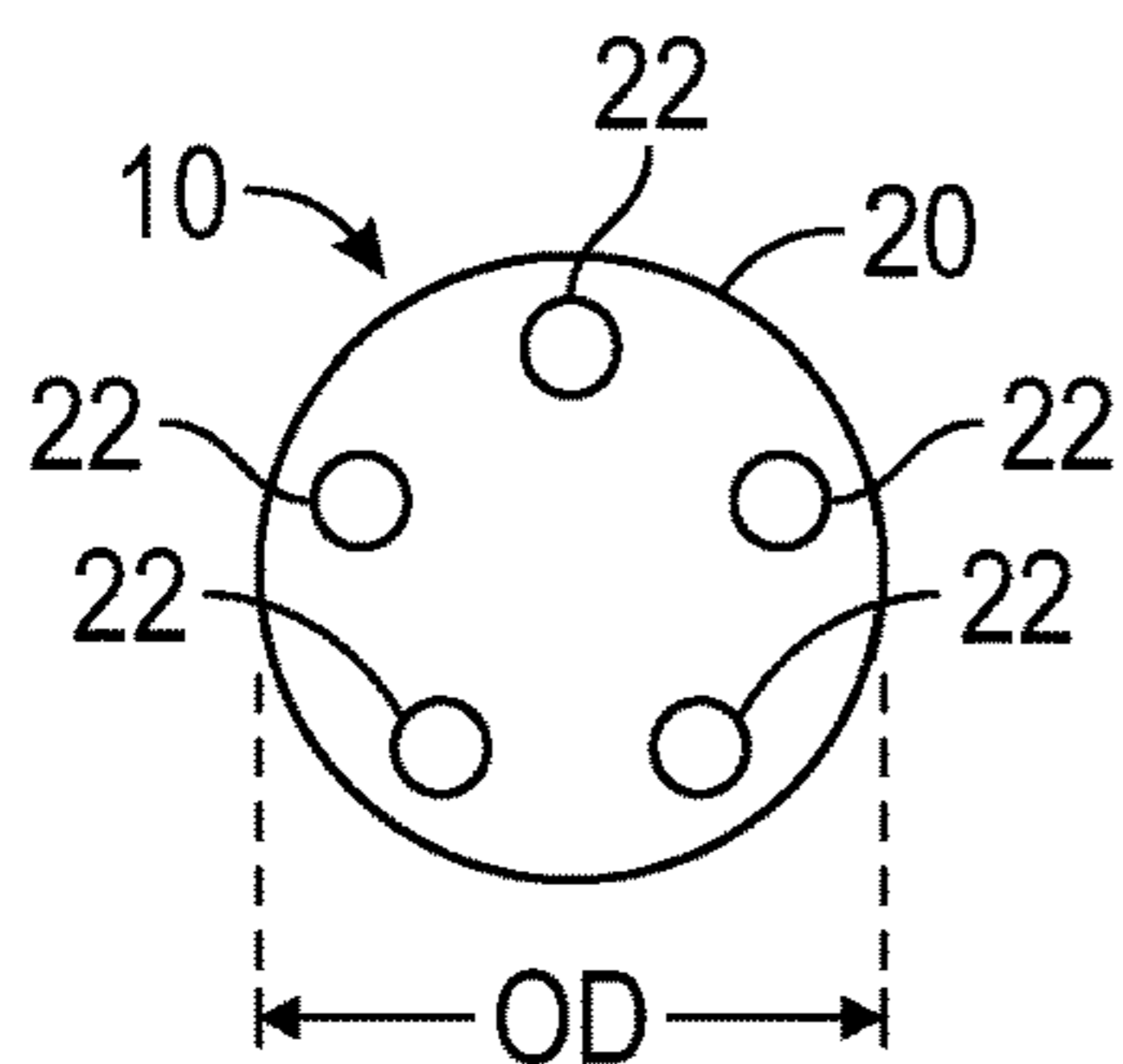


FIG. 7

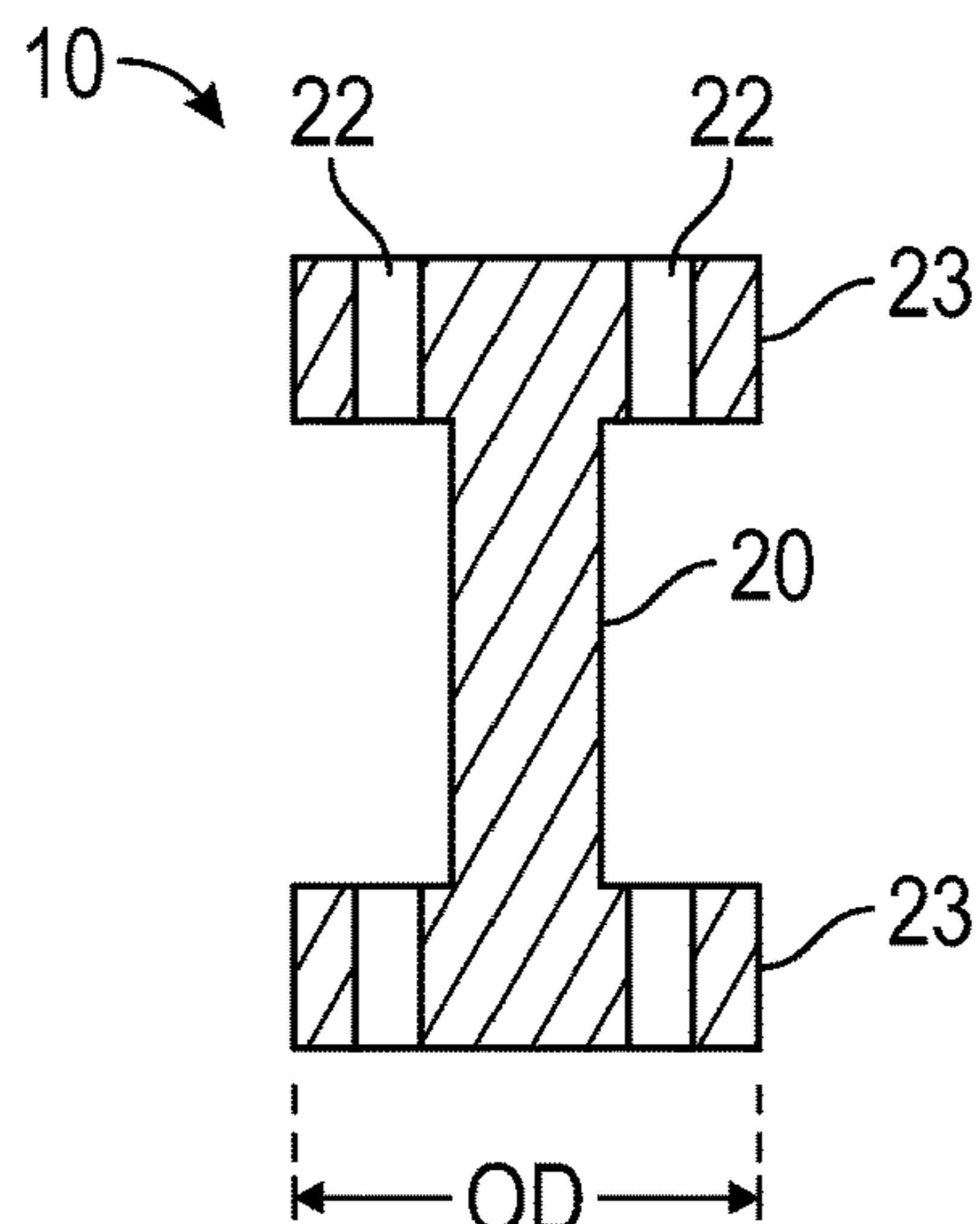


FIG. 8

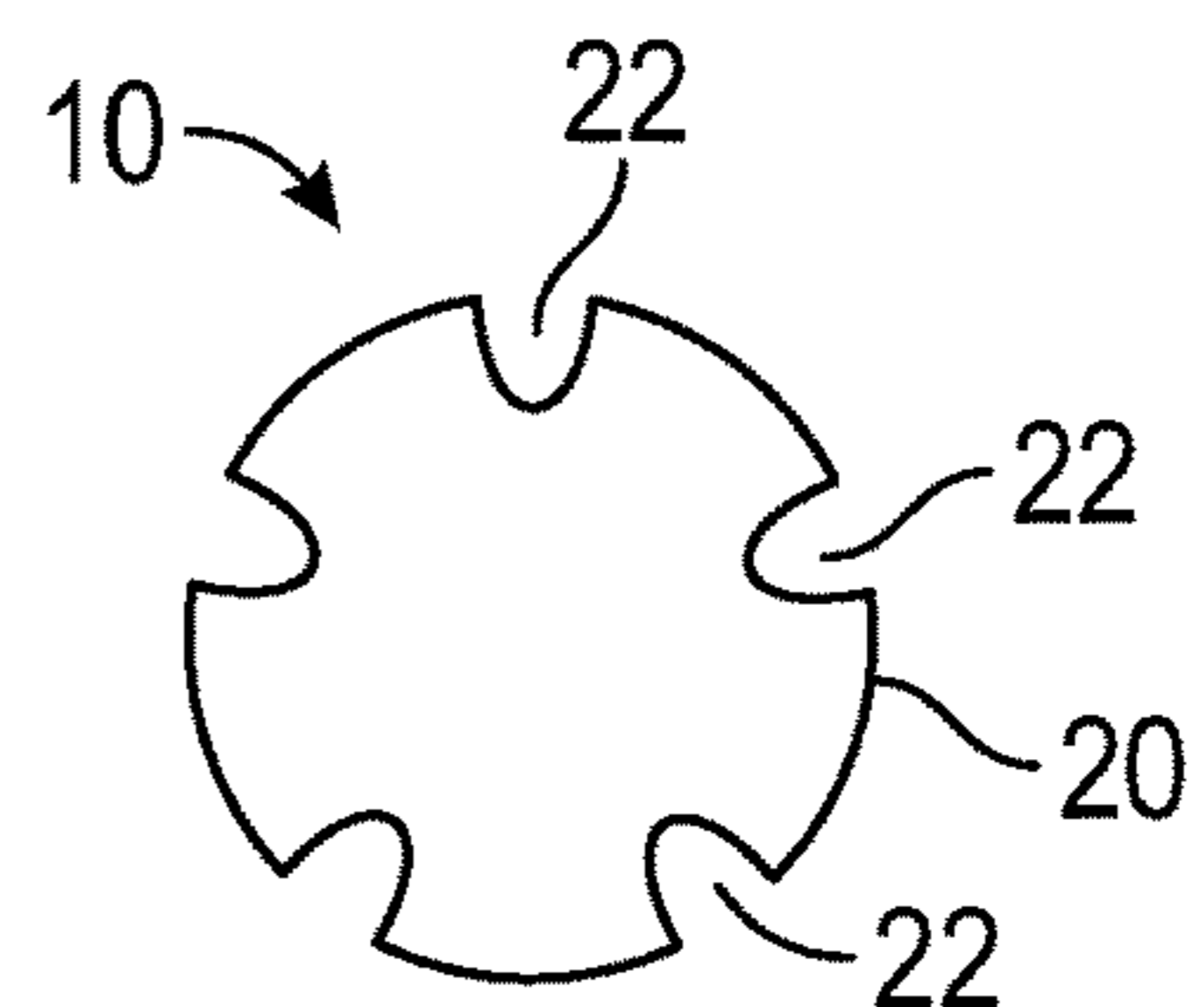


FIG. 9

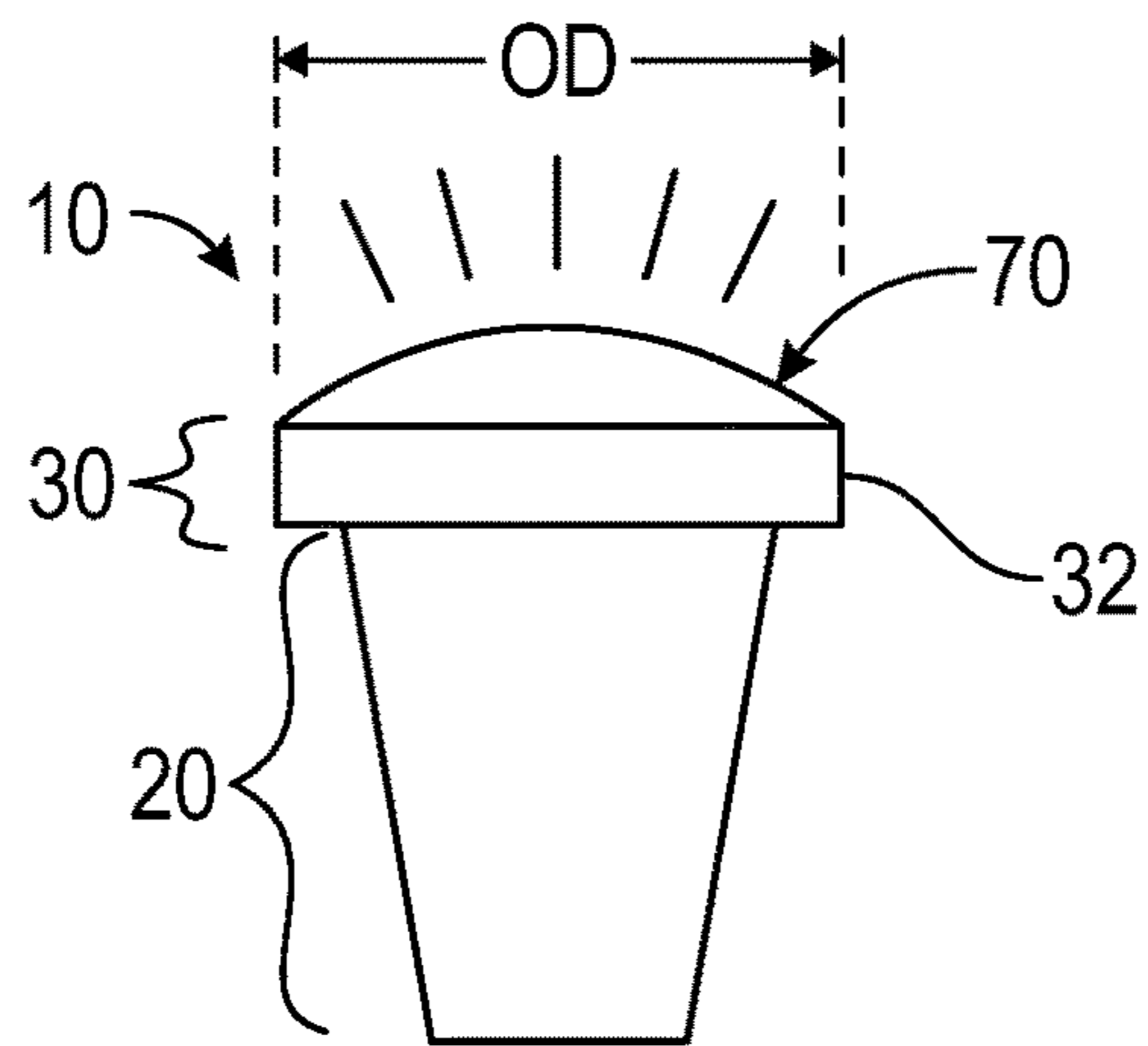


FIG. 10

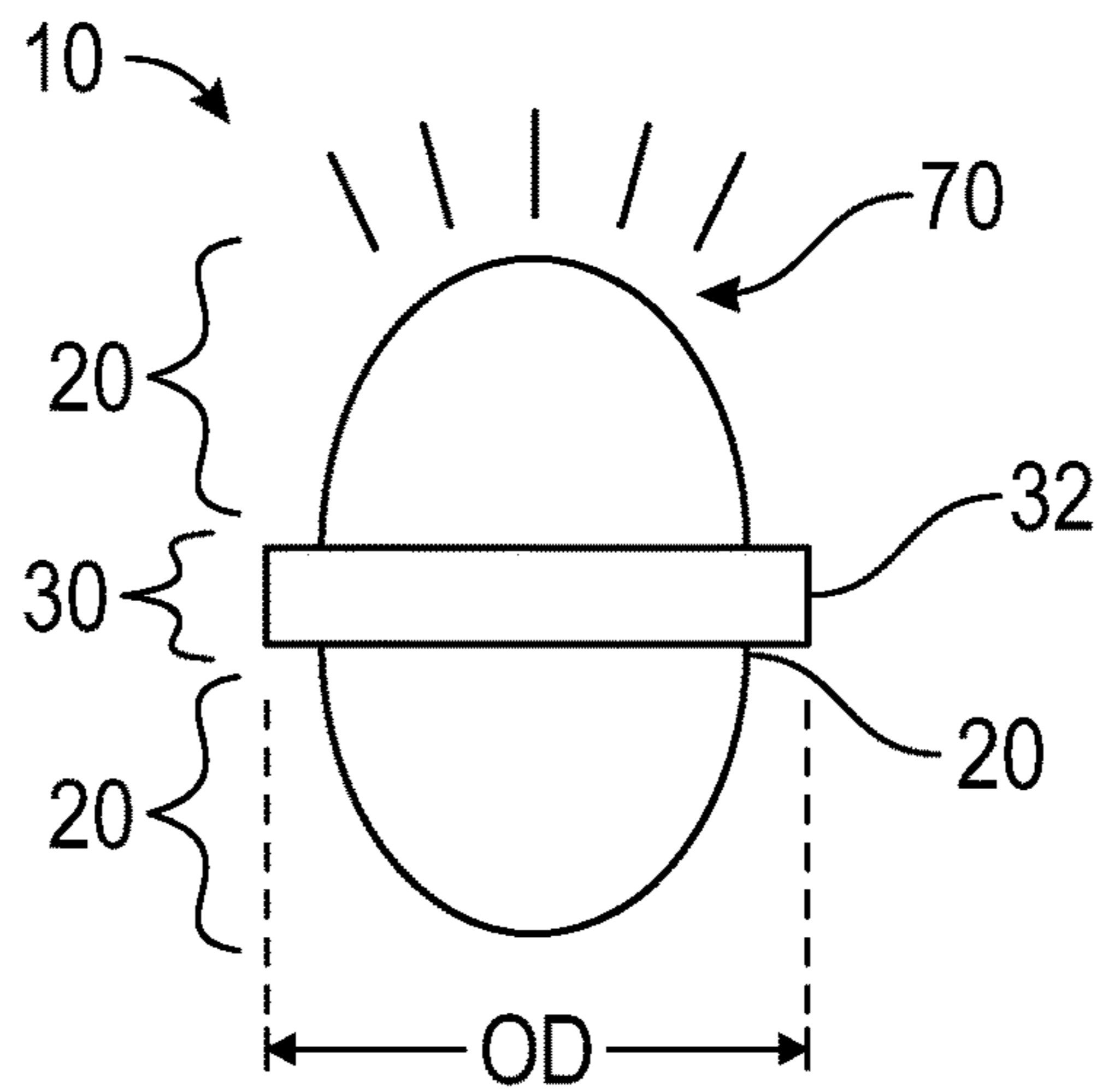


FIG. 11

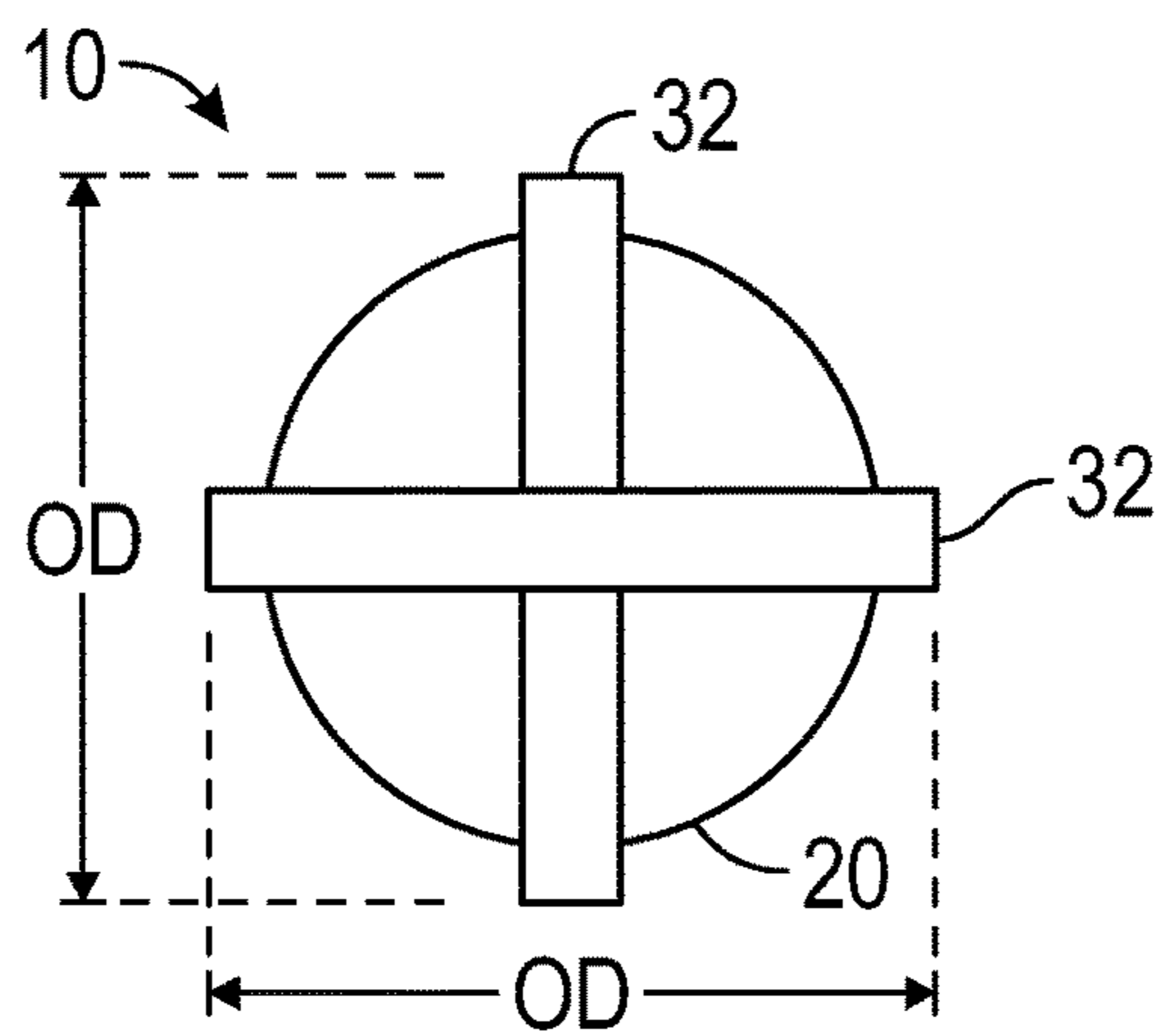


FIG. 12

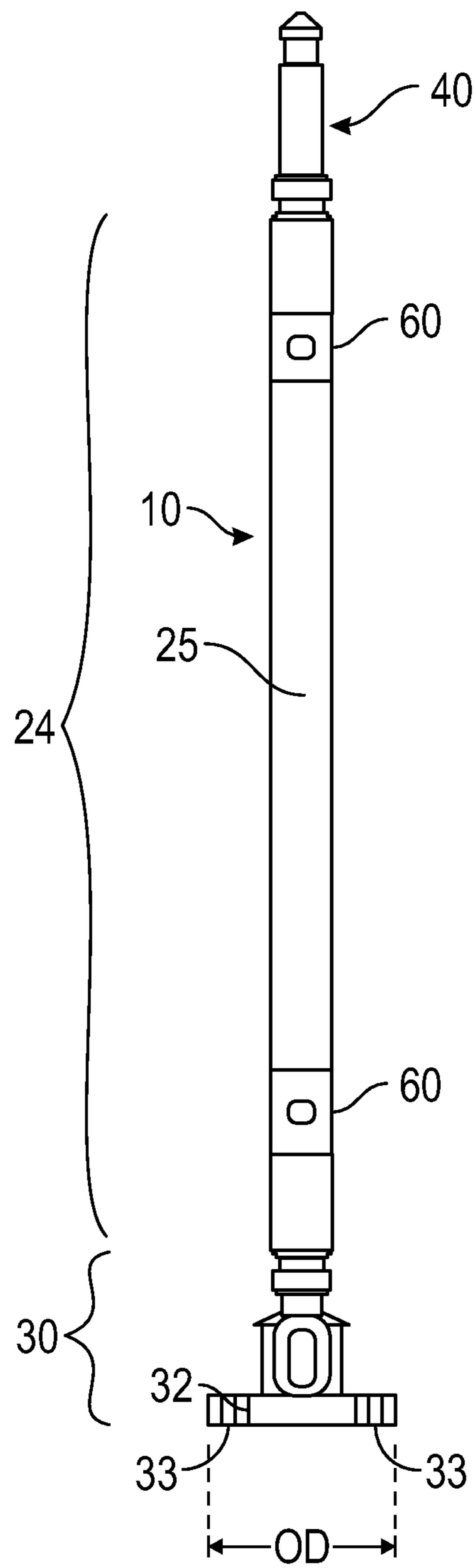


FIG. 13

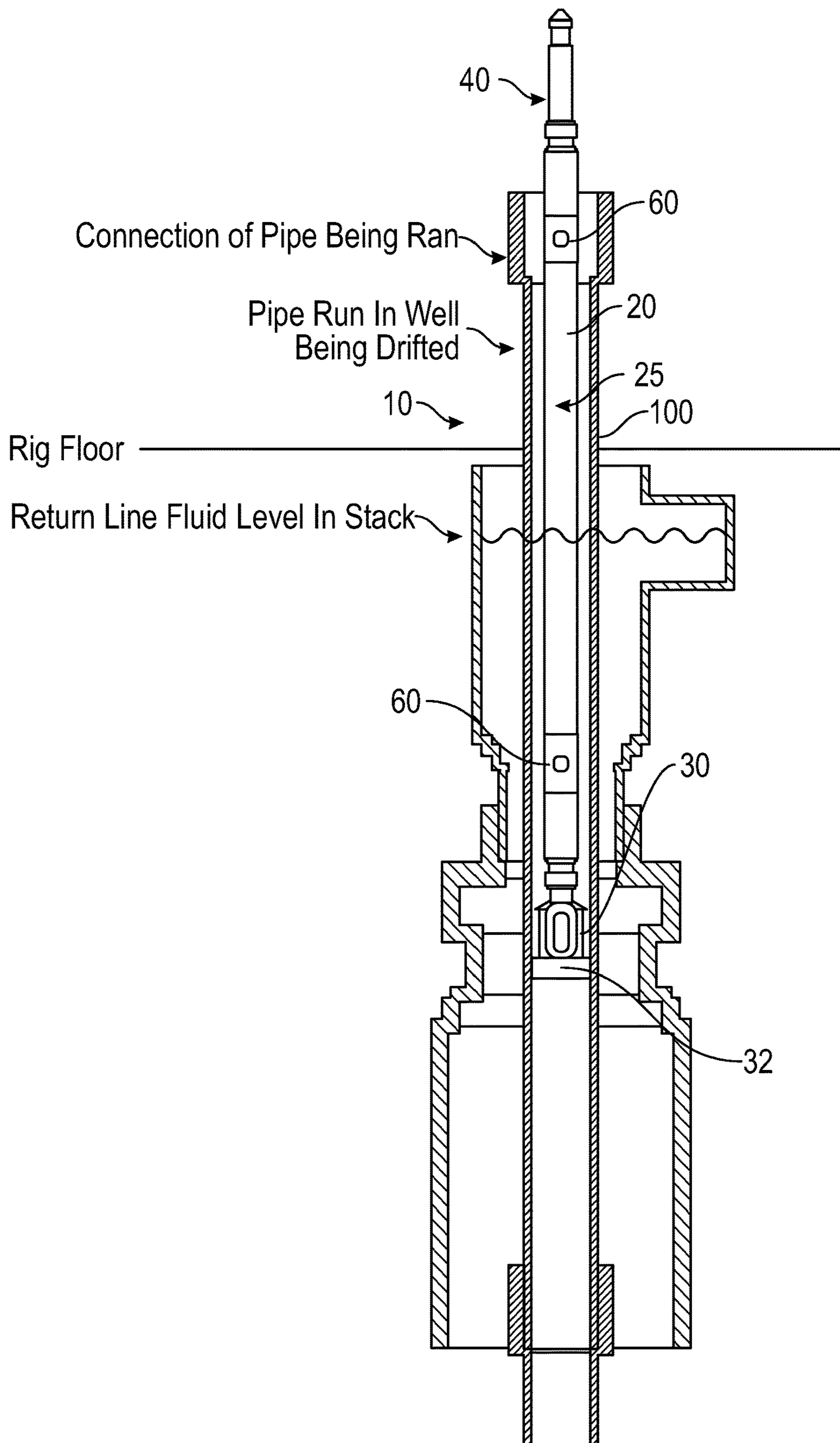


FIG. 14

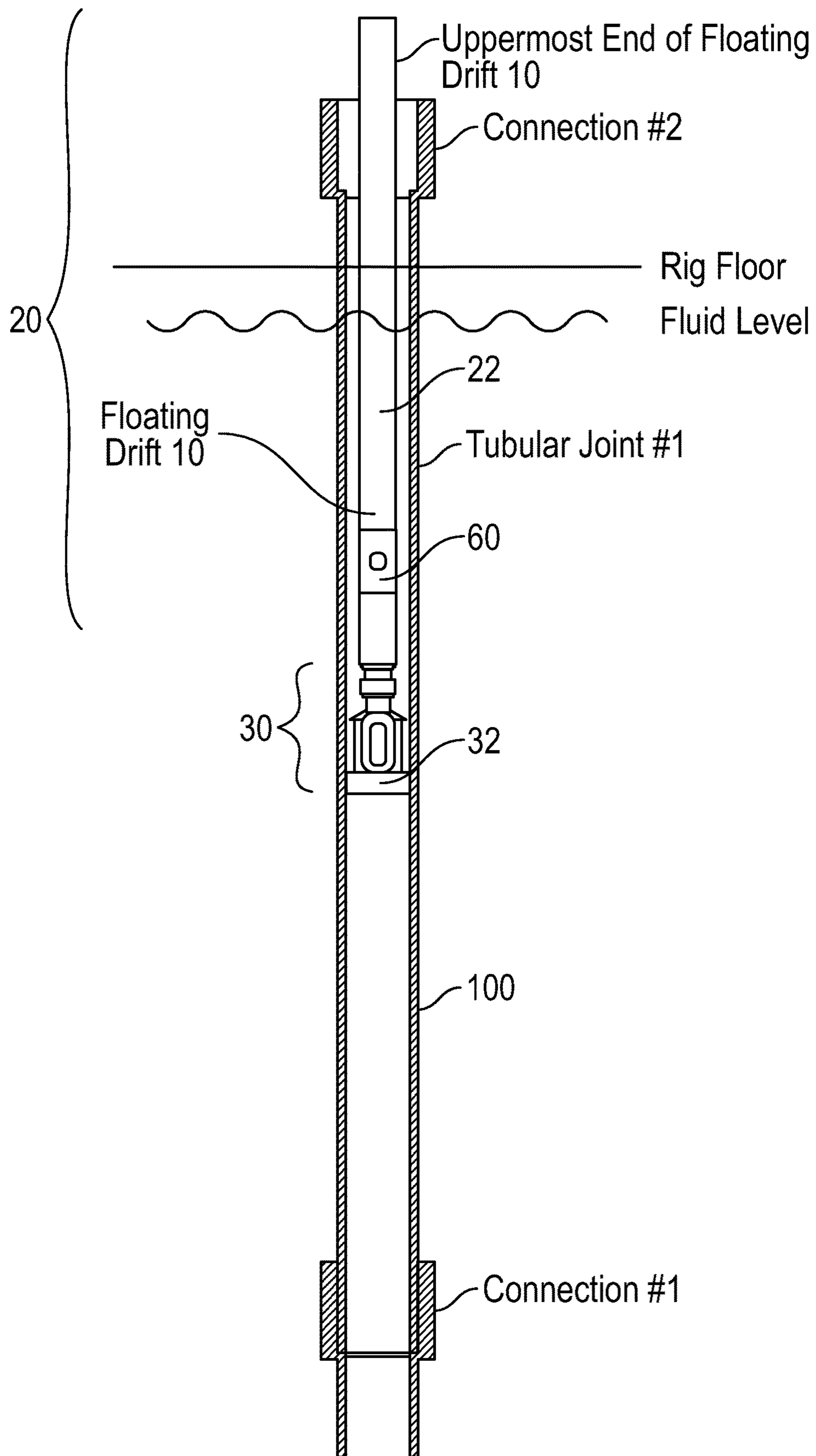


FIG. 15

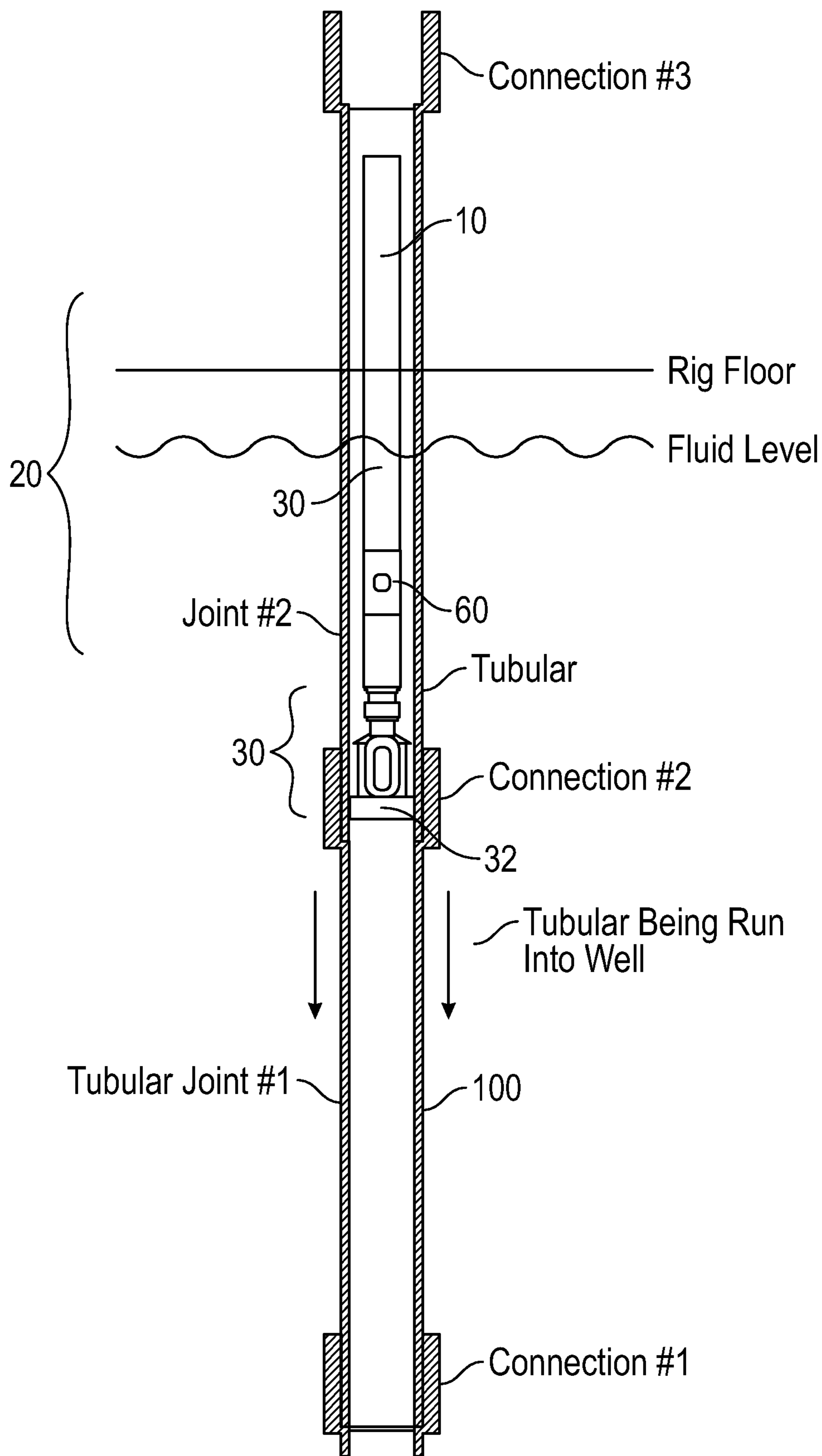


FIG. 16

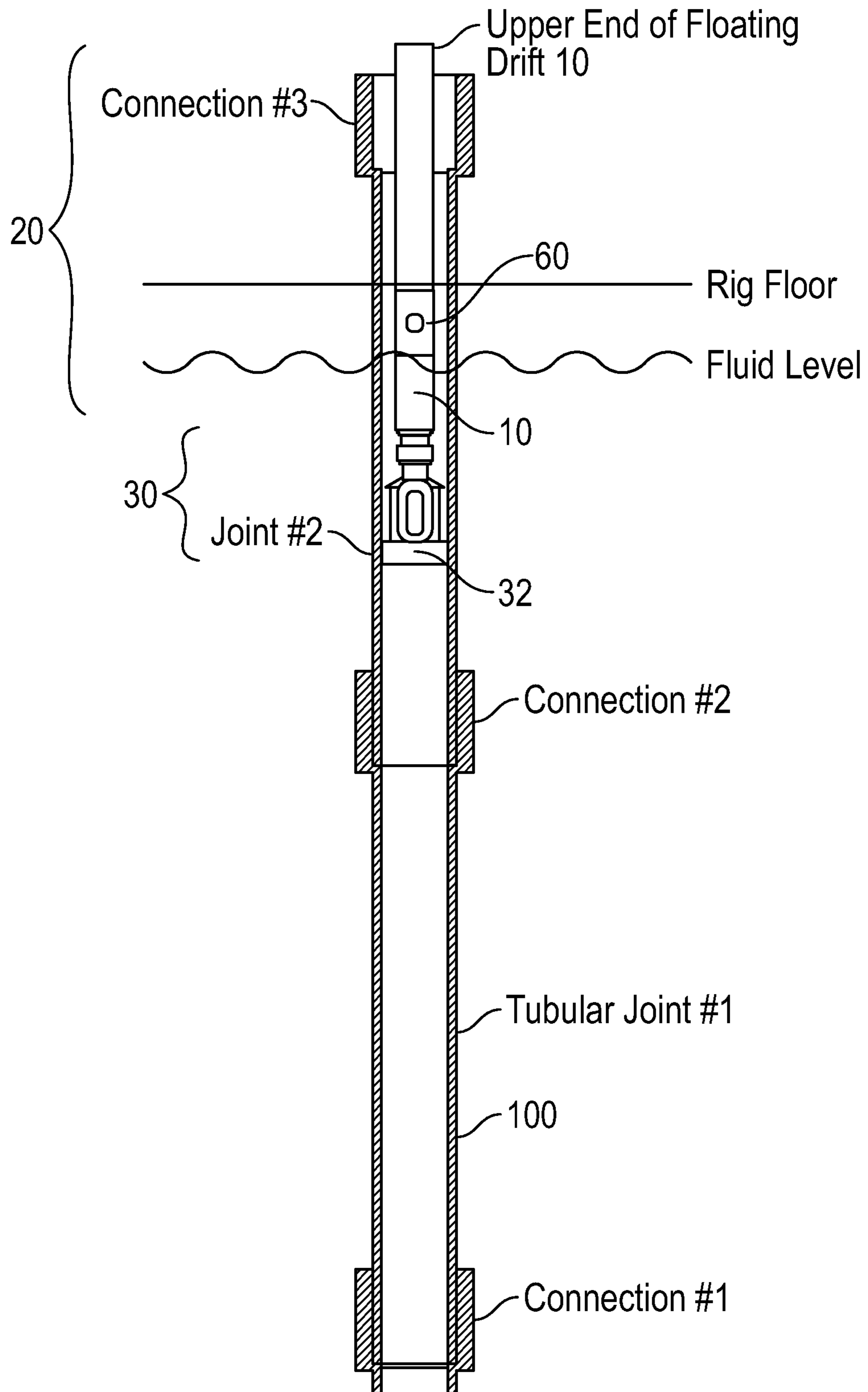


FIG. 17

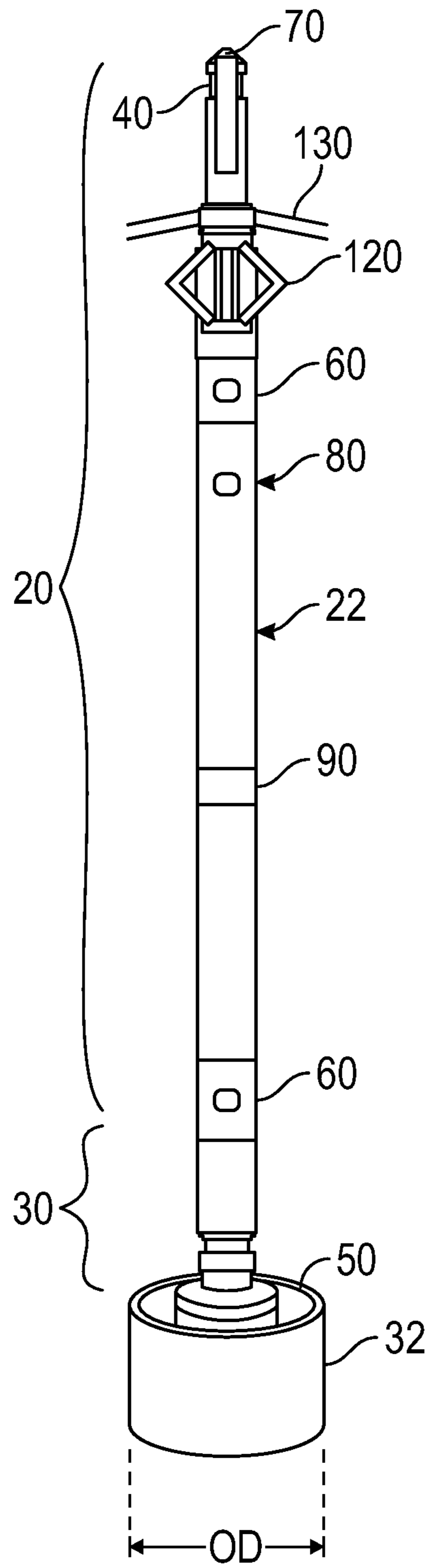


FIG. 18

**APPARATUS FOR VERIFYING THE INNER
DIAMETER OF TUBULARS FORMING A
TUBULAR STRING**

CROSS REFERENCE TO RELATED
APPLICATIONS

This non-provisional patent application claims priority to U.S. provisional patent application Ser. No. 62/810,537, filed Feb. 26, 2019. The disclosure of that provisional patent application is incorporated herein by reference, to the extent not inconsistent with this disclosure.

BACKGROUND

Field of the Invention

This invention relates to apparatus used in connection with the drilling, completion, and servicing of oil and gas wells.

Various types of tubular goods or “tubulars” are run in these wells, including but not limited to drill pipe, smaller diameter strings commonly known as “work strings,” tubing strings, and larger diameter “casing,” drilling risers, or any tubular member. Almost all of these tubular goods are in sections or “joints,” typically on the order of 30 to 40 feet in length. The joints are typically coupled together with threaded connections. Other types of connections are used at times. All of such tubular goods will be collectively referred to at times as “tubulars.” The tubulars are coupled or connected together or “made up” into a tubular string, which ultimately are run into a wellbore. Tubulars are often run into a wellbore by a drilling rig having a rig floor at which the tubulars, and/or the tubular string, are landed in slips at the rig floor, as the tubulars are coupled together joint by joint to form a tubular string. For purposes of this application, “tubular” and “tubular string” is intended in its broadest manner, to include but not be limited to all of the above-mentioned tubular members.

Industry standards related to tubulars define an inner “drift diameter” for a given tubular, which may be a function of the tubular outer diameter and wall thickness. The drift diameter, which may be referred to herein as the “drift ID,” is the minimum inner diameter (“ID”) for a tubular to have, to remain within specifications. It is important that all tubulars run into a wellbore satisfy this inner diameter specification, namely have an inner diameter of at least the drift ID and were not manufactured with a too-small inner diameter; or during transit, handling, makeup in the tubular string or for other reasons the minimum diameter was compromised.

Verifying the inner diameter of the tubulars, in particular the drift ID, within a tubular string is important because (for example) after the tubulars are run into the wellbore, it may be required to run some sort of device down into the tubular string within the wellbore, for example a logging tool, a ball to activate a downhole tool, slickline tools, another smaller diameter tubular, etc. Since the clearances between the outer diameter of such devices and the inner diameter of the tubular in the wellbore may be very close, it is essential to verify that the drift ID of the tubular run into the wellbore is within a desired specification, or the future-run device may not be able to go downhole. In some settings, an ID other than the specification drift ID may be desired to be verified, usually an ID slightly larger than the drift ID. In yet other cases, it may be desired to verify that an ID smaller

than the drift ID is in place. In this application, any desired tubular ID may be referred to as a “drift ID.”

Traditionally, this ID verification was done by dropping a device known as a “drift” having a known outer diameter down through the tubular, usually on the rig floor, before it was made up into tubular string and run into the wellbore. At times, such device may also be referred to as a “gauge ring,” although that term is more properly applied to a device used to ensure a minimum tubular ID other than the drift ID (typically smaller than the drift ID). The drift may take the form of an elongated tool having a ring member with an outer diameter (“OD”) equal to or slightly smaller than the drift ID of the tubular. If the drift successfully passed through the tubular, then the inner diameter was deemed satisfactory (i.e. the minimum drift ID was verified). If the drift did not pass through, then that tubular drift ID was undersize and that joint of tubular could not be run into the borehole. Without going into detail, prior art methods of dropping a drift down through a tubular were time consuming. In addition, prior art methods have a high risk for a dropped object event that can result in injury to personnel on the rig floor, or dropping the drift downhole into the wellbore.

Yet another issue exists: it is possible that a given tubular may be of proper drift ID before it is screwed or otherwise connected together into the overall tubular string, hence that tubular would “drift” successfully; yet in the process of screwing the joints of tubular together, which may require substantial torque being placed on the threaded connection, an undersize ID situation may be created at the threaded connection. For example, the connection may be flattened slightly, creating a reduced drift ID section. This situation would however not be known perhaps until the entire tubular string was placed into the wellbore, and when a device with an outer diameter at or near the drift ID was attempted to be run through the tubular string. When that happens, depending upon the location of the undersize ID, the entirety of the tubular string must be removed from the well, at tremendous expense.

In summary, it is important to verify a desired minimum ID, whether that ID is the drift ID or some other ID, of tubulars in a wellbore, preferably after the tubulars have been made up into a tubular string in a wellbore, but as the tubular string is being run. In this manner, ID issues in the tubular string may be detected and resolved in a much more efficient manner.

SUMMARY OF THE INVENTION

The apparatus for verifying inner diameter in a tubular, which may be referred to as a “floating drift apparatus,” embodying the principles of the present invention comprises, fundamentally, a floating apparatus and methods of use of same in connection with tubular ID verification, as a tubular string is being run into a wellbore. The floating drift apparatus is typically (but not necessarily) elongated, having a desired outer diameter to verify a desired tubular ID. It is understood that the floating drift apparatus is sufficiently buoyant to float in the wellbore fluid. The floating drift apparatus is placed into the bore of a tubular string being run into a wellbore, where it floats in the wellbore fluid, and moves upwardly (in relative terms) through the tubular string as additional joints of tubular are made up or connected together (typically screwed together) forming the tubular string.

In other embodiments, the floating drift apparatus may comprise a float section and a drift section, the drift section

having a drift element (such as a circular ring) with a desired diameter, which may be at or slightly less than the drift ID for a given tubular. The float section has sufficient buoyancy to float the apparatus in a fluid within the bore of a tubular being evaluated (that is, the inner diameter being verified).
 In one embodiment, the drift section is positioned at or near the lower end of the float section, which may comprise an elongated flotation tube. As noted, the flotation or buoyancy from the flotation tube is sufficient to float the entire apparatus in wellbore fluid. The flotation tube may be 20 to 25 feet long, which is sufficient to extend from the typical fluid level in a tubular being run into a wellbore, out of the uppermost end of the uppermost tubular, which is typically 2 to 3 feet above the rig floor (with the tubular sitting in slips at the rig floor).

To use the apparatus, once the first tubular joint is run and is (typically) sitting in slips in the rotary of the rig (or in a similar setting), the floating drift apparatus is lowered into the bore of the tubular. The floating drift will submerge in the wellbore fluid to an extent, but floats with a portion of the floating drift apparatus below the fluid level in the tubular and the balance extending above the fluid surface. As noted, in one embodiment, the flotation tube is sufficiently long to extend to near the uppermost, open end of the uppermost tubular, and usually to extend beyond the open end by some distance, for example one foot. The floating drift apparatus remains in the bore of the tubular/tubular string.

The next (e.g. the second) joint of tubular is then made up (screwed together or otherwise connected) with the first joint of tubular, and the tubular string lowered to position the second joint in the slips at the rig floor, with the open end of the now-uppermost tubular typically several feet above the rig floor. The floating drift apparatus is still positioned within the bore of the tubular, more-or-less floating at its same location in the fluid, as the tubular string moves downhole around it into the wellbore. It is understood that the fluid level typically remains substantially constant as the tubular string is run into the borehole. In this manner, the floating drift apparatus traverses not only the tube of the tubulars, but also the threaded (or other type of) connections between the joints.

This process is repeated until the entirety of the tubular string is run into the wellbore. The floating drift apparatus, typically extending out of the open end of the uppermost tubular where it can be grasped, can then be simply pulled up out of the tubular string.

If at any time the floating drift apparatus is not at the surface after a joint of tubular has been made up, this indicates that the floating drift apparatus has lodged in a preceding tubular joint (whether in the "tube" or at a connection), due to an undersize ID being encountered; the floating drift apparatus being unable to pass through this spot to remain at the fluid surface. The tubular string can then immediately be lifted only one or two joints (or however many is required), the previous connections unscrewed, and the undersize ID very quickly located and identified. The undersize tubulars can then be removed and proper ones substituted.

It can be understood that some means to detect the presence and/or location of the floating drift apparatus is required; alternative embodiments include a visual detection of the upper end of the floating drift apparatus; a visual detection of a light attached to the floating drift; an audio detection; measurement via sound wave echo location; or other means known in the art. Attachments such as centralizers, junk baskets, scrapers, scratchers, etc. may be added

to the floating drift. A fishing neck may be added to the uppermost end of the floating drift apparatus to permit a fishing tool to latch onto the floating drift apparatus to retrieve it from the bore of the tubular string. The floating drift apparatus may comprise one or more rupture disks to protect against excessive fluid pressure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1-9 are views of various embodiments of the floating drift apparatus embodying the principles of the present invention.

FIGS. 10-12 are other embodiments of the floating drift apparatus.

FIG. 13 is a view of another embodiment of a floating drift apparatus embodying the principles of the present invention.

FIG. 14 is a view of the floating drift apparatus positioned within a tubular, with the tubular positioned at the rig floor and extending downwardly into the near-surface wellbore area (e.g. the fluid return equipment).

FIGS. 15-17 illustrate a sequence of running several joints of tubular into a wellbore, as the floating drift apparatus remains substantially in the same location, floating in the wellbore fluid.

FIG. 18 is another embodiment of the floating drift apparatus.

DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENT(S)

With reference to the figures: FIGS. 1-9 show various embodiments of floating drift apparatus 10 (which may be referred to at times as floating drift or drift apparatus), all embodying certain principles of the present invention. Floating drift apparatus 10 fundamentally comprises a body 20 having a sufficient buoyancy force to cause floating drift apparatus 10 to float in a wellbore fluid. Body 20 comprises a desired outer diameter, denoted in the figures as OD. It is understood that OD is selected based on what inner diameter (ID) of the tubular is sought to be verified. Preferably, floating drift apparatus 10 further comprises one or more fluid flow passages 22, whereby fluid can flow by floating drift apparatus 10 when floating drift apparatus 10 is positioned within the bore of a tubular. In FIGS. 2 and 3, flow passage 22 is a longitudinal bore. In FIGS. 4 and 5, flow passages 22 are longitudinal slots positioned around the outer circumference of body 20. In FIGS. 6 and 7, flow passages 22 are a plurality of longitudinal bores through body 20.

Yet other shapes are possible for floating drift apparatus 10. FIGS. 8 and 9 show a generally dumbbell shaped body 20, with longitudinal bores through the enlarged end sections.

Yet other embodiments of floating drift apparatus 10 are shown in FIGS. 10-12. Certain of these will be discussed in more detail later in this application. FIG. 10 shows a tapered body 20 with a float section 24 and a drift section 30, and a drift element 32 of a desired OD, along with a light 70. FIG. 11 shows an egg-shaped body 20 with drift element 32 of a desired OD. FIG. 12 shows a generally spherical body 20, preferably with two drift elements 32, each of a desired OD.

With reference to the figures, especially FIGS. 14-17, the present invention also comprises a method for verifying the inner diameter of tubulars forming a tubular string, comprising the steps of:

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a. lowering one or more joints of tubulars forming a tubular string, into a wellbore containing a fluid, said fluid entering a bore of said tubular string;

b. placing a floating drift apparatus **10** having a desired outer diameter into said bore, floating drift apparatus **10** having sufficient buoyancy to float in the fluid; and

c. continuing to connect additional joints of tubulars to said tubular string and to lower the tubular string into said wellbore, floating drift apparatus **10** moving relatively upwardly through the bore of said tubular string as the tubular string is lowered into the wellbore.

ADDITIONAL EMBODIMENTS OF THE
APPARATUS AND METHOD OF THE PRESENT
INVENTION

With reference to FIGS. **13-17**, floating drift apparatus **10** comprises a buoyant float section **20** and a drift section **30**. Float section **20** may take various forms, but in preferred embodiments is a generally elongated element. Drift section **30** is attached to float section **20**, and comprises drift element **32** having a desired dimension, namely outer diameter (OD) as shown, which may be a circular ring with a desired OD. Typically, the OD of drift element **32** is equal to or slightly less than the drift ID of the tubular being evaluated (verification of ID). It is understood that the OD of drift element **32** may be any desired dimension, whether to verify a drift ID or some smaller ID. It is further understood that drift element **32** may be a complete circular or ring shape; or alternatively may be a "broken" ring (having an interrupted circumference) or may have passages through it for fluid flow. It is understood that the buoyancy force from float section **20** is sufficient to float the entire apparatus in wellbore fluid.

A presently preferred embodiment of floating drift apparatus **10** is shown in FIG. **13**. Floating drift apparatus **10** comprises a float section **24** comprising an elongated flotation tube **25**, which by way of example may be 20 to 25 feet long. Drift section **30**, which is typically connected to a lower end of float section **24**, may comprise a drift element **32** having a desired OD. The buoyancy from float section **24** is sufficient to float the entire apparatus in wellbore fluid. The length of flotation tube **25** (as noted, typically 20 to 25 feet long) is preferably sufficient to extend from the typical fluid level in the bore of the tubular in the borehole to at or above the open, upper end of the uppermost tubular joint, which is typically positioned 2 to 3 feet above the rig floor. For example, flotation tube **25** may extend one foot or more out of the upper end of the tubular.

Drift element **32** has a desired OD, typically substantially equal to the drift diameter for the tubular being run, but which may be any desired dimension; for example, the apparatus may be used to verify only a "gauge" inner diameter to ensure safe running of a tool within the tubular, which is typically a diameter smaller than the drift ID. Drift section **30**, or drift element **32**, may be interchangeable on flotation tube **25**.

Additional elements may include rupture discs **60** on flotation tube **25**, and a wireline fishing neck **40** on the upper end of float section **20**, to permit retrieval or "fishing" of the apparatus if needed. A so-called "junk basket" **50** (see FIG. **6**, described in more detail below) may be added, typically to a lower part of floating drift **10**. Rupture disk **60** permits fluid to enter the internal portion of flotation tube **25**, in the event that floating drift apparatus **10** is subjected to high pressures due to being placed at a greater-than-expected

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depth in the wellbore fluid, for whatever reason. This feature avoids collapse of flotation tube **25**.

AN EXEMPLARY METHOD OF USE

While the floating drift of the present invention lends itself to various methods of use, with reference to the drawings some of the presently preferred methods can be described. As a general diagram to illustrate an exemplary field setting, FIG. **14** shows floating drift apparatus **10** positioned inside the bore of a tubular which is positioned at the surface, typically in slips in the rig floor, noted in the figure. Various other components of the general setting are also shown in FIG. **14**, including an exemplary fluid level within the bore of tubular string **100**.

FIGS. **15-17** illustrate a sequence of running tubulars into a borehole with floating drift **10** in place. Certain elements shown in FIG. **14** are omitted for clarity. FIG. **15** illustrates an exemplary starting point of running the tubular string. A first joint of tubular (labeled tubular joint #1) is in place, typically in slips in the rotary. It is understood that multiple joints of tubular are joined or connected together (e.g. by threaded connections) to form a tubular string. The fluid level inside tubular joint #1 is shown, with floating drift **10** floating in the fluid. The lowermost end of the tubular is shown with connection #1 shown (which may take various forms; the notation of connection #1 is primarily for reference purposes). As can be seen, the uppermost end of tubular joint #1 is above the rig floor, and the uppermost end of floating drift apparatus **10** may extend beyond (out of) the uppermost end of tubular joint #1. In FIGS. **15-17**, fishing neck **40** is omitted for clarity.

FIG. **16** illustrates the next joint of tubular, joint #2, being run into the wellbore. It is understood that joint #2 has been coupled together or connected with joint #1 at connection #2. The fluid level remains more or less constant. The position of floating drift apparatus **10**, relative to the rig floor, also remains more or less constant, as the joints of tubular are run downhole around floating drift apparatus **10**. FIG. **16** illustrates drift section **30**, and more particularly drift element **32**, passing through connection #2. It can be understood that in the position shown in FIG. **16**, drift element **32** has passed through joint #1, is passing through connection #2, and will be passing through joint #2 (i.e. the tube thereof), thereby verifying the proper ID of those tubulars and the connections between them.

FIG. **16** shows joint #2 in place in slips at the rig floor. The uppermost end of floating drift apparatus **10** is extending beyond the uppermost end of joint #2, thereby verifying that drift section **30**/drift element **32** has passed through joint #1 and connection #2, and at least a portion of joint #2.

This described sequence is repeated as the remainder of the tubular string is run into the wellbore. It can be understood that in this manner, the ID of the entirety of the tubular string can be verified.

It is to be understood that in a preferred embodiment floating drift apparatus **10** comprises some means to allow an operator to detect or verify the presence/location of floating drift apparatus **10** within the tubular. In some embodiments, the means for detecting or verifying the location of floating drift apparatus **10** is a simple visual one, by the operator seeing floating drift **10**, whether or not floating drift apparatus **10** extends out of the uppermost end of the tubular. Other means for detecting the location of floating drift apparatus **10** include an indicator light **70**, see FIGS. **10**, **11** and **18** as examples. Indicator light **70** may be a battery powered light known in the relevant field.

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Another embodiment of floating apparatus drift **10** is shown in FIG. **6**. As noted above, in this embodiment, floating drift apparatus **10** comprises an indicator light **70** at its uppermost end. Still further optional/supplemental means for detecting the presence of floating drift apparatus **10** include electronic devices, e.g. Wifi, RFID or similar devices, denoted generally as **80**. Still other means may include echo location, denoted schematically as **90**. Equipment for implementing these means for detection are known in the relevant art. Floating drift apparatus **10** may further comprise centralizer **120**, a junk basket **50**; or wire scrapers/scratchers, denoted generally as **130**; and/or a magnet.

MATERIALS

Materials for floating drift apparatus **10** are commonly known in the relevant industry, including high strength steel, non-ferrous, non-metallic seal elements if required, etc. Methods of manufacturing would include those commonly used for similar apparatus.

OTHER EMBODIMENTS

Various apparatus for verifying inner dimensions of tubulars can embody the principles of the present invention. FIG. **10** shows an embodiment in which float section **20** is generally disposed below drift element **30**, when the apparatus is in place within the bore of a tubular. An indicator light **70**, which may be battery powered, may be disposed on floating drift **10** and positioned so as to be visible from above. An operator can then visually detect the location of floating drift **10** even though floating drift apparatus **10** does not extend out of the tubular string. With this embodiment, retrieval of floating drift **10** may be by a magnet or other means.

Yet another embodiment is shown in FIG. **11**, in which float section **20** is a generally oblong shape on which drift section **30**, including drift element **32**, is connected.

Still another embodiment is shown in FIG. **12**, in which floating drift apparatus **10** generally takes the form of a sphere having a desired diameter. In this embodiment float section **20** and drift section **30** are effectively merged into one, comprising one or more drift elements **32** so as to provide the drift ID verification regardless of orientation of floating drift **10** within the bore of the tubular.

CONCLUSION

It is understood that the foregoing description presents various embodiments of the present invention, by way of example and not limitation. Various changes can be made to the apparatus and methods embodying the principles of the invention. Therefore, the scope of the invention is not limited by the foregoing examples, but by the appended claims and the legal equivalents thereof.

We claim:

1. A method for verifying the inner diameter of tubulars forming a tubular string, comprising the steps of:

- a. lowering one or more joints of tubulars forming a tubular string, into a wellbore containing a fluid, said fluid entering a bore of said tubular string;
- b. placing a floating drift apparatus having a desired outer diameter into said bore, said floating drift apparatus having sufficient buoyancy to float in said fluid; and

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- c. continuing to connect additional joints of tubulars to said tubular string and to lower said tubular string into said wellbore, said floating drift apparatus moving relatively upwardly through said bore of said tubular string as said tubular string is lowered.
- 2.** The method of claim **1**, further comprising the step of:
 - d. visually detecting a location of said floating drift apparatus as said tubular string is lowered into said wellbore.
- 3.** The method of claim **2**, wherein in the event that said step of visually detecting determines that said floating drift apparatus is lodged within said bore of said tubular string, said method further comprises the steps of:
 - e. raising said tubular string from said wellbore a sufficient distance to determine where said floating drift apparatus is lodged; and
 - f. removing any tubulars having undersize inner diameters from the tubular string.
- 4.** The method of claim **3**, further comprising the step of:
 - g. after said tubulars having undersize inner diameters are removed from said tubular string, replacing said floating drift apparatus in said tubular string bore and re-commencing connecting joints of tubular into said tubular string and lowering said tubular string into said wellbore.
- 5.** A method of verifying that the internal diameter of tubulars in a tubular string satisfies dimensional requirements, while said string of tubulars is being run into a wellbore containing a fluid, comprising the steps of:
 - a) providing an apparatus comprising:
 - an elongated buoyant float section having an upper end and a lower end, said float section having sufficient buoyant force to float said apparatus in said fluid; and
 - a drift section attached to said lower end of said float section, said drift section comprising a drift element having a desired diameter relative to said internal diameter of said tubulars;
 - b) with one or more of said tubulars run into said wellbore, placing said apparatus into a bore of said one or more tubulars, whereby said apparatus floats in fluid contained within said bore of said tubular;
 - c) connecting another joint of tubular to said one or more tubulars, forming a tubular string, and lowering said tubular string farther into said wellbore; and
 - d) verifying that said apparatus has moved through said tubular string and the connections joining said tubulars, as said tubular string moves downwardly into said wellbore.
- 6.** The method of claim **5**, whereby a length of said buoyant section is sufficient to extend out of the uppermost end of said tubular string, a sufficient distance for said apparatus to be grasped and removed.
- 7.** The method of claim **5**, wherein said apparatus further comprises a light proximal said upper end, and wherein the step of verifying that said apparatus has moved through said tubular string and the connections joining said tubulars is carried out by visual detection of said light.
- 8.** The method of claim **5**, wherein said apparatus further comprises an electronic means for verifying that said apparatus has moved through said tubular string.

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